

WHAT IS CLAIMED IS:

1. A system for removing dust, dirt and the like from the surface of a flexible paper substrate comprising:

a transport assembly for conveying the paper substrate along a path of travel;

the transport assembly including a rotating vacuum drum having an outer surface over which the paper substrate is trained in the direction of drum rotation as it moves along the path of travel;

openings in the outer surface of the vacuum drum;

motivating means for producing a slight speed differential between the linear speed of the paper substrate and the surface velocity of the vacuum drum; and

a suction source connected to the openings in the outer surface of the vacuum drum whereby dust, dirt and the like on the surface of the paper substrate are drawn away by the suction as the paper substrate sweeps over the drum.

2. A system as in claim 1 wherein the openings in the outer surface of the vacuum drum are arranged on an outer periphery of the drum and comprise a plurality of circular openings.

3. A system as in claim 1 wherein the openings in the outer surface of the vacuum drum are arranged on an outer periphery of the drum and comprise a plurality of slotted openings each having an orientation substantially parallel to each other.

4. A system as in claim 3 wherein each slotted opening extends from one side of the drum to the outer.

5. A system as in claim 3 wherein pairs of spaced apart slotted openings extend from one side of the drum to the other.

6. A system as in claim 1 including an adjustment device connected to shift the vacuum drum transversely relative to the path of travel of the paper substrate to thereby adjust the position of the outer surface of the drum and the openings therein relative to the paper substrate.

7. A system as in claim 1 wherein the paper substrate includes perforations.

8. A system as in claim 1 wherein the transport assembly includes:
a second rotating vacuum drum having an outer surface over which the paper substrate is trained in the direction of rotation of the second drum as it moves along the path of travel;

openings in the outer surface of the second vacuum drum;

a second suction source connected to the openings in the outer surface of the second drum; and

the vacuum drums rotating in opposite directions whereby dust, dirt and the like on one side of the paper substrate are drawn away by the suction applied to one drum while dust, dirt and the like on the other side of the paper substrate are drawn away by the suction applied to the second drum as the paper substrate moves along the path of travel and sweeps over the drum surfaces.

9. A method of removing dust, dirt and the like from the surface of a paper substrate comprising the steps of:

transporting the paper substrate along a path of travel;

training the paper substrate over at least a portion of the outer surface of a vacuum drum having openings therein;

applying suction to the openings in the outer surface of the vacuum drum;

moving the paper substrate at a slightly different linear velocity from the surface velocity of the vacuum drum; and

drawing away dust, dirt and the like from one surface of the paper substrate through the openings as the paper substrate sweeps over the vacuum drum surface.

10. A method as in claim 9 including the further steps of:

training the paper substrate over at least a portion of the outer surface of a second vacuum drum having openings therein;

rotating the second vacuum drum in a direction opposite to the rotation of the other vacuum drum;

applying suction to the openings in the outer surface of the second vacuum drum; and

drawing away dust, dirt and the like from the other surface of the paper substrate as the paper substrate moves along the path of travel.

11. A method as in claim 9 including the step of transversely shifting the vacuum drum to thereby adjust the position of the outer surface of the drum relative to the paper substrate.

12. A method as in claim 9 wherein the paper substrate includes perforations and dust, dirt and the like within the perforations are removed by the applied suction.

13. A system for transporting a paper substrate along a path of travel without or limited side-to-side oscillations comprising:

a transport assembly for conveying the paper substrate along a path of travel;

the transport assembly including a rotating vacuum drum having an outer surface over which the paper substrate is trained in the direction of drum rotation as it moves along the path of travel;

openings in the outer surface of the vacuum drum; and

a suction source connected to the openings in the outer surface of the drum for holding the substrate against the surface of the drum and thereby preventing or limiting side-to-side oscillations.

14. A system as in claim 13 wherein the linear speed of the paper substrate is substantially equal to the surface velocity of the vacuum drum.